

Special Issue on  
**Wireless Communications for IoT and Industry 4.0**

# CALL FOR PAPERS

The recent emergence of new paradigms such as the Internet of Things (IoT) and Industry 4.0 (I-4.0) brings about new challenges for the communication infrastructure.

Both I-4.0 and IoT are currently subject of noticeable research interest, featuring significant intersections. In fact, I-4.0 pillars include cybersecurity, cloud computing, big data analytics, horizontal/vertical integration, and the usage of cyberphysical systems, that is, devices that feature deeper integration between hardware and software than their predecessors. Conversely, IoT fields of application include machine-to-machine (M2M) interfacing, wireless sensor network protocols, acting as a backbone for data exchange between cyberphysical systems, and SCADA. All these fields are I-4.0 enablers. Another strong enabler is cloud computing, supporting process virtualization and externalization of services.

The adoption of IoT and I-4.0 paradigms implies potential advantages and challenges. Potential advantages of I-4.0 include increased efficiency in resource management, availability of self-optimizing systems, and flexible mass production. Long run effects are expected to be innovation and the transition to new services and business models, where decisions may be taken using augmented reality or fully delegated to autonomous systems. On the other hand, while wireless porting of previous wired solutions is an established approach (see, e.g., solutions such as Wireless Hart or Wi-Fi implementation of field busses), the increased diffusion of smart machinery aimed at providing useful data, supporting a finer control of various organizational activities, introduces a new set of requirements that include increased interconnection and data flow within the organizational units (big data), management of increased data loads, and increased permeability of the organizational boundary, via externalization of services. For instance, cloud storage and computing are nowadays proposed as a commercial solution that moves Fieldbus function blocks and related processing capabilities to the cloud. Moreover, software-defined networks may require a significant review of older network infrastructures that are oriented to a static architecture. The mentioned trends can require interconnection of heterogeneous communication networks, bringing about interfacement and security issues. Additional constraints may be application specific, as for those related to ensuring deterministic and real-time behavior. Hence, the perceived challenges include real-time operation, management of redundant data, coexistence of heterogeneous communication systems, privacy, and security, all of them affecting the communication infrastructure.

This special issue targets, mainly but not exclusively, papers focused on relevant research issues in IoT related to the I-4.0 world, ranging from the theory to understand and model those systems to the development of applications.

Potential topics include but are not limited to the following:

- ▶ I-4.0 oriented wireless communication systems
- ▶ IoT and I-4.0 applications and experience reports
- ▶ IoT/I-4.0 oriented network operations and management
- ▶ Network performance modeling and measurement
- ▶ IoT patterns and software development and patterns for IoT and I-4.0
- ▶ Software-defined networking for IoT
- ▶ IoT and I-4.0 testbeds
- ▶ Coexistence and interference problems in wireless networks
- ▶ Dependability of IoT and I-4.0: security and fault tolerance
- ▶ Fog and cloud computing
- ▶ Big data on IoT and I-4.0 environments
- ▶ Data storage and cloud for IoT and I-4.0
- ▶ IoT theory: system-level models
- ▶ Current standardization activity for IoT and I-4.0

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Papers are published upon acceptance, regardless of the Special Issue publication date.

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